

**BLAKELY** 1279 OAKMEAD PARKWAY  
**SOKOLOFF** SUNNYVALE, CALIFORNIA 94085  
**TAYLOR &** (408) 720-8300 (Telephone)  
**ZAFMAN** (408) 720-8383 (Facsimile)

A LIMITED LIABILITY  
PARTNERSHIP INCLUDING  
LAW CORPORATIONS

**FACSIMILE TRANSMITTAL SHEET (TRANSMITTAL TO PTO)**

**Deliver to:** Examiner Jennifer A. Boyd  
**Firm Name:** U.S. PATENT AND TRADEMARK OFFICE  
**Fax Number:** (571) 273-1473 **Telephone No.:** \_\_\_\_\_  
**From:** John P. Ward  
**Date:** July 13, 2004 **Time:** 1130AM  
**Operator:** Patricia Richard **Matter:** 42390P10242  
**Number of pages including cover sheet:** 5  
**Enclosed are the following documents:** Per your voicemail to John P. Ward,  
attached is Exhibit A for Declaration Under 37 CFR 1.131 that was filed on  
4/01/2004 for Application No. 09/751,261.

**CERTIFICATE OF TRANSMISSION**

I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office on:

**Date of Transmission** July 13, 2004

Patricia Richard

(Typed or printed name of person transmitting paper)

(Signature of person transmitting paper)

**CONFIDENTIALITY NOTE**

The documents accompanying this facsimile transmission contain information from the law firm of Blakely Sokoloff Taylor & Zafman LLP that is confidential or privileged. The information is intended to be for the use of the individual or entity named on this transmission sheet. If you are not the intended recipient, be aware that any disclosure, copying, distribution, or use of the contents of this faxed information is prohibited. If you have received this facsimile in error, please notify us by telephone immediately so that we can arrange for the retrieval of the original documents at no cost to you.

IF YOU EXPERIENCE ANY DIFFICULTY IN RECEIVING THE ABOVE PAGES, PLEASE CALL (408) 720-8300 AND ASK FOR THE OPERATOR NAMED ABOVE.

05/01/03

**P10242**  
**15853**  
 ATTORNEY-CLIENT PRIVILEGED COMMUNICATION  
**INTEL INVENTION DISCLOSURE**  
 DATE: 6 July 2000 *Mobile Platforms / IAG / TRL / NFL*

It is important to provide accurate and detailed information on this form. The information will be used to evaluate your invention for possible filing as a patent application. When completed and signed, please return this form to the Legal Department at JF3-147. If you have any questions, please call 264-0444.

1. Inventor: Ghosh Prosenjit  
 Last Name First Name Middle Initial  
 Phone 533-696-6199 M/S: HT1-05 Fax # 503-696-1392  
 Citizenship: USA WWID: 10553165 Contractor: YES NO X  
 Inventor E-Mail Address: Prosenjit.ghosh@intel.com  
 Home Address: 14863 NW Jewell Lane  
 City Portland State OR Zip 97229 Country USA  
 \*Corporate Level Group (e.g. IABG, NCG, CEG) IAG Division Technology & Research Labs Subdivision Mobile Architecture Lab  
 Supervisor\* Dan Lenehan WWID 10026457 Phone 765-5853 M/S: RN6-49

**\*If you are unsure of this information, please discuss with your manager.  
 (PROVIDE SAME INFORMATION AS ABOVE FOR EACH ADDITIONAL INVENTOR)**

2. Title of Invention: High Efficiency Thermal Interface Medium
3. What technology/product/process (code name) does it relate to (be specific if you can): **RECEIVED**
4. Include several key words to describe the technology area of the invention in addition to # 3 above: **JUL 31 2000**  
**PATENT DATABASE GROUP**  
**INTEL LEGAL TEAM**
5. Stage of development (i.e. % complete, simulations done, test chips if any, etc.):
6. (a) Has a description of your invention been, or will it shortly be, published outside Intel:  
 NO: YES: If YES, was the manuscript submitted for pre-publication approval?  
 IDENTIFY THE PUBLICATION AND THE DATE PUBLISHED:
- (b) Has your invention been used/sold or planned to be used/sold by Intel or others?  
 NO: YES: DATE WAS OR WILL BE SOLD:
- (c) Does this invention relate to technology that is or will be covered by a SIG (special interest group)/standard/ or specification?  
 NO: YES: Name of SIG/Standard/Specification:
- (d) If the invention is embodied in a semiconductor device, actual or anticipated date of tapeout?
- (e) If the invention is software, actual or anticipated date of any beta tests outside Intel
7. Was the invention conceived or constructed in collaboration with anyone other than an Intel blue badge employee or in performance of a project involving entities other than Intel, e.g. government, other companies, universities or consortia? NO: YES: Name of individual or entity:
8. Is this invention related to any other invention disclosure that you have recently submitted? If so, please give the title and inventors: Method to Decrease the Thermal Resistance in Interface Materials -- Prosenjit Ghosh

**PLEASE READ AND FOLLOW THE DIRECTIONS ON  
 HOW TO WRITE A DESCRIPTION OF YOUR INVENTION**

ATTORNEY-CLIENT PRIVILEGED COMMUNICATION

## ATTORNEY-CLIENT PRIVILEGED COMMUNICATION

Please attach a description of the invention to this form, DATED AND SIGNED BY AT LEAST ONE PERSON WHO IS NOT A NAMED INVENTOR, and include the following information:

1. Describe in detail what the components of the invention are and how the invention works.

Background

As shown schematically in Figure 1, a typical heat transfer assembly comprises:

1. A Thermal Plate (or a heat sink, spreader plate, vapor chamber etc.);
2. An interface material; and
3. A heat source.

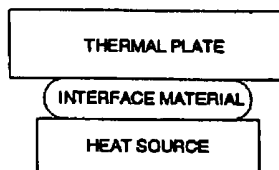


Figure 1 -Typical Heat Transfer Assembly

The interface material is used since mating surfaces of the heat source and the thermal plate are always somewhat irregular. The irregularity is a bi-product of manufacturing capabilities & cost limitations.

The invention describes a high efficiency thermal interface material to transmit heat from a heat source to a thermal plate. The interface material is primarily thermally conductive malleable fibers immersed in a suitable medium such as thermal grease or gel. The metallic fibers can be configured in multiple patterns. Three examples - stacked, random, or woven are shown below. These patterns are shown in Figure 2 as top views with respective section views through each.

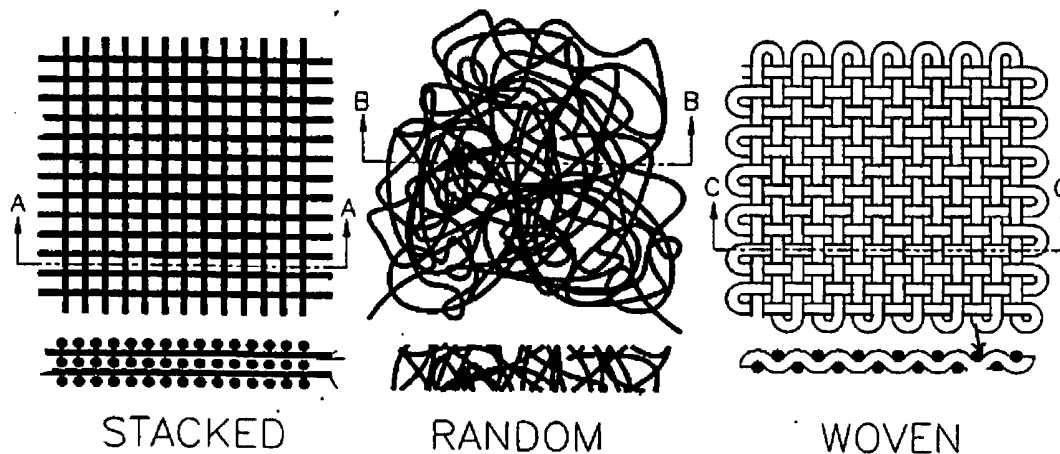


Figure 2 - Examples of the Invention

This interface material is sandwiched between the heat source and the thermal plate, similar to conventional interface materials. The material conformable to all irregularities on the heat source and thermal plate surfaces and is especially adept to high tolerated stack up assemblies. Once the assembly is secured, the conductive fibers deform and conform to the mating surfaces and contact each other making continuous "paths" of metal for efficient heat transfer. The grease or gel, rather than acting as the primary medium for heat transfer, acts as a supplementary vehicle aiding the conductive fibers by

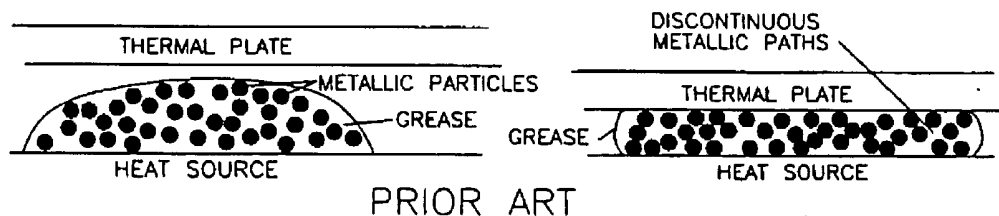
ATTORNEY-CLIENT PRIVILEGED COMMUNICATION

**ATTORNEY-CLIENT PRIVILEGED COMMUNICATION**

eliminating the voids. The power of this concept lies in the conductive fiber material and pattern selection against the needs of the respective application.

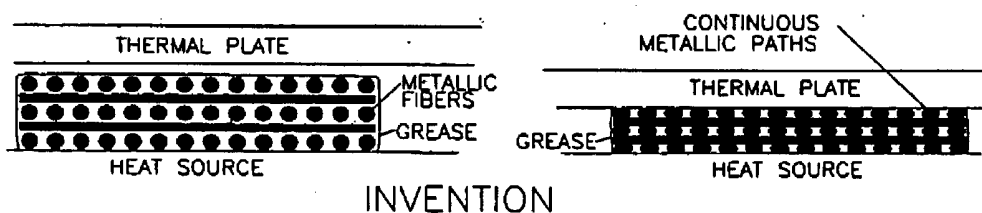
**2. Describe advantage(s) of your invention over what is done now.**

Prior art interface materials embed metallic particles in a grease, or gel to improve its heat transfer properties. The thermal transfer rate of the grease is only a fraction of the thermal transfer rate of the embedded metallic particles. The thermal transfer rate of the combination is therefore limited by the spaces between the metallic particles. When the interface material is compressed between the thermal plate, and the heat source, spaces still exist. This situation is shown in Figure 3.



**Figure 3 - Prior Art Interface Materials**

The advantages of the invention are shown in Figure 4. When the thermal plate compresses the material the metallic fibers contact one another, form continuous paths of metal, and enable efficient heat transfer.



**Figure 4 - Advantages of the Invention**

This conformed interface material thermally behaves in unison similar to a one piece material w/ high thermal properties, with out exhibiting the technical issues (thermal stress, CTE, etc) associated w/ such a material.

**3. YOU MUST include at least one figure illustrating the invention.**  
**If the invention relates to software, include a flowchart or pseudo-code representation of the algorithm.**

Please see Figures 2 and 4.

**4. Value of your invention to Intel (how will it be used?).**

The invention provides a more effective, and more reliable, method of removing heat from integrated circuits.

**5. Explain how your invention is novel. If the technology itself is not new, explain what makes it different.**

The prior art has attempted to solve the problem of irregular mating surfaces between heat sources and thermal plates by creating thermal greases and gels. The prior art has

**ATTORNEY-CLIENT PRIVILEGED COMMUNICATION**

**ATTORNEY-CLIENT PRIVILEGED COMMUNICATION**

attempted to increase the thermal transfer properties of greases and gels by adding high thermally conductive particles.

By contrast, this invention uses soft high thermally conductive fibers which when compressed form continuous metal paths for high efficiency heat transfer.

6. **Identify the closest or most pertinent prior art that you are aware of.**  
The prior art discloses numerous greases, gels, and epoxies.
7. **Who is likely to want to use this invention or infringe the patent if one is obtained and how would infringement be detected?**  
Any component or systems manufacture who needs to remove heat from an electrical component. Infringement can be detected through visual inspection of interface materials used by any potential infringer.

**\*HAVE YOUR SUPERVISOR READ, DATE AND SIGN COMPLETED FORM**

DATE: \_\_\_\_\_ SUPERVISOR: \_\_\_\_\_

BY THIS SIGNING, I (SUPERVISOR) ACKNOWLEDGE THAT I HAVE READ AND UNDERSTAND THIS DISCLOSURE, AND RECOMMEND THAT THE HONORARIUM BE PAID

**ATTORNEY-CLIENT PRIVILEGED COMMUNICATION**